MODIFIED APPENDIX.

DETAILED COURSES OF STUDY AND SCHEMES OF EXAMINATION.

INTERMEDIATE EXAMINATION IN ARTS

I. ENGLISH.

The texts for non-detailed study shall be two in number, and none set for any one examination shall be repeated within three years.

Certain of the set books which have to be studied in detail may be retained from year to year.

The books for detailed study shall include one play of Shakespeare, and texts in prose and poetry.

There shall be two papers on English Language and Literature. The first paper shall be called the composition paper and shall consist partly of such tests as epitomisation and expansion, and partly of subjects for composition drawn from the subject matter of the texts prescribed for non-detailed study. The second paper shall be on the texts set for detailed study.

In both papers the number of questions set shall be larger than the number the candidate is required to answer.

All papers in the examination shall be so set that candidates shall be able to obtain full marks without answering questions relating to purely literary criticism or scholarship.

II. SECOND LANGUAGE.

(1) Kannada.

There shall be two papers, one on prescribed texts and grammar and the second on composition. The courses of study shall consist of poetry and prose, both ancient and modern, and drama with grammar for the text paper and prescribed modern prose books for non-detailed study in connection with the composition paper.

(2) Tamil.

(*a*) Poetry—about 300 stanzas.
(*b*) Prose—about 120 pages of Classical Prose.
(*c*) Grammar, and
(*d*) Composition—about 200 pages of prose for non-detailed study.

(3) Telugu.

There shall be two papers, one on Telugu language and the other on composition. The first paper shall consist of questions on the text-books prescribed and on the grammar and idiom of the language and the second paper shall be on composition.

The books to be set under this head shall include the following :—

(1) One selection from the Mahabharata or other early classic.
(2) One selection from the mediæval poets or a drama.
(3) One modern prose work.

The candidates are expected to show an acquaintance with the elements of grammar, including the elements of prosody and rhetoric of the language.

(4) Urdu.

Texts and Grammar.
Composition (Essay Writing).

(5) Sanskrit

(*a*) Detailed study of books prescribed from time to time.
(*b*) Grammar and Prosody as in Macdonell's "Sanskrit Grammar for Beginners" or Kale's "Smaller Sanskrit Grammar."
(*c*) Translation of unseen passages from Sanskrit into English and *vice versa*.

(6) Persian

(*a*) Detailed study of books prescribed from time to time.
(*b*) Grammar and Prosody.
(*c*) Translation from unseen passages from Persian into English and *vice versa*.

(7) *French*

Verbs.—1. Auxiliary verbs: Avoir, Etre.

2. The four regular conjugations. Formation of tenses. Simple and compound tenses. Active and Passive voice.

3. The following irregular verbs: Aller, Envoyer, Dormir, Mentir, Sortir, Ouvrir, Offrir, Venir, Tenir, Acquerir, Mourir, Courir, Devoir, Savoir, Pouvoir, Vouloir, Valoir, Voir, Plaindre, Joindre, Conduire, Construire, Nuire, Luire, Ecrire, Vaincre Suivre, Rire, Dire, Faire, Mettre, Prendre, Battre, Connaitre, Nitre, Croire, Plaire, Taire, Lire, Boire, Conclure, Resoudre, Vivre.

4. The Impersonal verbs: Yavoir, Falloir.

Note.—(*a*) Only a few simple rules for the idiomatic use of certain tenses, *e.g.*, the imperfect and the preterite, and the tenses in conditional and temporal clauses should be taught.
(*b*) In the irregular verbs it will be enough to know the forms; the idiomatic usages of certain verbs such as Savoir, Faire, need not be studied.
(*c*) The subjunctive mood may be entirley omitted.

The Articles.—Definite, Indefinite, Partitive.

Nouns.—Masculine; feminine; singular; plural; abstract nouns; names of countries. Possessive case. Indirect objective case. Nouns used partitively.

N. B.—No attempt should yet be made to give rules for determining the gender of nouns; irregular formation of feminines of nouns and adjectives will not be expected at this stage. Knowledge of the abnormalities of accidence is not expected.

Adjectives.—Agreement. Position. Forms for feminine and for plural. Comparison, regular and irregular. Adjectives with two masculine forms. Demonstrative. Possessive. Qualifying, Numeral. Time. Dates. Measurement.

Pronouns.—Personal. Possessive. Demonstrative. Interrogative. Relative. Conjunctive. Disjunctive. Indefinite. En. Y.

Adverbs.—Adverbs of quantity. Position. Formation. Comparison.

Prepositions.—(*a*) De, A, En, Dans, Avec, Devant, Avant, Pour, Pendant, Depuis, Sans, Sur, Sous.

(*b*) The difference in idiomatic usage between the following pairs of prepositions: avec and de; par and de, dans and en; avant and devant; pour and pendant.

(*c*) Prepositions after adverbs of quantity.

Sentences.—(*a*) Affirmative, negative, interrogative, (affirmatively and negatively), imperative, exclamatory.

(*b*) Simple, compound, easy, complex with conditional, relative and temporal clauses

N. B.—No complex sentences demanding the use of the subjunctive mood will be given for composition.

Verbs.—(*a*) Impersonal, reciprocal, reflexive, all irregular verbs.

(*b*) The subjunctive mood. Five main rules for the use of the subjunctive in subordinate clauses:—

(1) When the principal verb expresses wish, will, command, consent.
(2) When the principal verb expresses doubt, uncertainty.
(3) When the principal verb denotes an emotion of the mind with regard to the statement contained in the dependant clause.
(4) After impersonal verbs or after phrases expressing any of the abovementioned ideas or feelings.
(5) After certain conjunctions.

(*c*) The infinitive mood. Without preposition. With "de" with "a" with "sans." "apries" "pour" "par." The infinitive used in place of other moods, *e.g.*, when the second verb has the same subject as the first verb. The infinitive after "faire," "laisser."
(*d*) The participles. Their agreement.
(*e*) Verbs requiring no preposition in English but requiring "de" or "a" in French.
(*f*) Orthographic peculiarities of certain regular verbs.
(*g*) Idiomatic use of Savior, Faire, Devoir, Vouloir.

Nouns.—Rules of gender. Nouns which are masculine or feminine according to meaning. Irregular feminine formations. Plural of nouns. Nouns used only in the plural. Nouns with additional meaning in the plural. Compound nouns. Formation. Plural of compound nouns.

Adjectives.—All feminine forms of adjectives. Adjectives that change their meaning according to their position.

Pronouns.—Relative position of personal pronouns when the verb has two pronoun objects.

Prepositions and Conjunctions.—Syntax.

Sentences.—Illustrative of the above.

Translation.—(1) From set text-books of narrative prose.
(2) At sight from narrative prose.

The rudiments of French Prosody in connection with the reading of easy poetical texts.

Two text-books, one easy and one more difficult by prose-writers to be studied during the full course.

A text-book of easy poetry for the Senior Intermediate.

335

III. OPTIONAL SUBJECTS

(1) A SELECTED LANGUAGE

(a) Old and Middle Kannada

Same as for Kannada taken as Second Language.

(b) Modern Kannada

Same as for Kannada taken as Second Language.

(c) Tamil

Same as for Tamil taken as Second Language.

(d) Telugu

Same as for Telugu taken as Second Language.

(e) Urdu

Same as for Urdu taken as Second Language.

(f) Sanskrit

Same as for Sanskrit taken as Second Language.

(g) Arabic

(a) Detailed study of books prescribed from time to time.
(b) Grammar and Prosody.
(c) Translation from unseen passages from Arabic into English and *vice versa*.

(h) Persian

Same as for Persian taken as Second Language.

(i) French

Same as for French taken as Second Language.

Note.—The standard for any language taken as a Selected Language shall be the same as the standard for the same language taken as Second Language, in respect of syllabus, text-books and examination.

(2) ANCIENT HISTORY (including Indian History)

History of Greece to the death of Alexander the Great and History of Rome to the death of Augusts, and History of India to 1206 A.D.

The following books are recommended to indicate the scope of the subjects : —

(1) Edmund's or Bury's (abridged) History of Greece.
(2) Well's or Shuckburgh's History of Rome.
(3) V. A. Smith's (Oxford) History of India or Longmans' History of India for the Intermediate classes.

(3) MODERN HISTORY (including Indian History)

History of England from 1485 A.D., with special reference to the growth of the Empire and of English political institutions, and History of India from 1206 A.D.

The scope of the subjects shall be as indicated in

(1) Warner and Marten's 'Ground Work of British History,' Masterman's History of the British Constitution, and Egerton's History of the Growth of the British Empire.
(2) Same as mentioned in (3) under Ancient History.

(4) LOGIC INCLUDING ELEMENTARY PSYCHOLOGY OF REASONING PROCESS.

DEDUCTIVE LOGIC (FOR THE JUNIOR INTERMEDIATE).

1. The Difinition of Logic. The problem, aim and scope of Logic. The relation of Logic to Psychology, Thought and Language. The Division of Logic into Formal and Material.
2. Classification of Terms. Denotation and Connotation. Predicables. Definition. Division. Classification. Description.
3. Nominalism, Conceptualism, Realism.
4. Judgments or propositions : Categorical, Hypothetical, Disjunctive. Logical forms of propositions. Import of propositions. Opposition of propositions. Conversion. Observation, Contraposition, Inversion, Modality.
5. Inferences : Immediate and Mediate ; Deductive and Inductive.
6. Syllogism : Nature, method and rules of syllogistic reasoning. Moods and figures.
7. Enthymemes and Sorities.

8. Direct and Indirect Reduction of Arguments.
9. Hypothetical and Disjunctive Arguments.
10. Dilemma.
11. Fallacies pertaining to Deduction.
12. Laws of Thought.

INDUCTIVE LOGIC (FOR THE SENIOR INTERMEDIATE).

1. Induction: Nature and Presuppositions of Inductive Reasoning. The relation of Induction to Deduction.
2. Meaning and Implications of the Principles of Causality and the Uniformity of Nature. Proof and Discovery.
3. Observation and Experiment. Methods of Induction. Value of Negative Instances.
4. Generalisation. Hypothesis. Explanation. Classification.
5. Fallacies pertaining to Induction.
6. Chance and Probability. Statistical Method.
7. Aims and Ideal of Sciences. The Scientific Attitude of Mind.
8. Limitations of Science.
9. Method of Social Sciences.

NOTE.—The study of Logic, both Deductive and Inductive, should be accompanied by a knowledge of the Psychology of Reasoning Processes.

1. The Chief Cognitive and Accessory Processes.
2. The Sensory Basis of Knowledge.
3. The Formation of Concepts.
4. Analysis of processes involved in Judgments and Inferences.
5. Meaning and its Relation to action and Language.
6. Unconcious Elements in Reasoning: Prejudice, Sentiment, Intuition.
7. Thought and its Relation to Conative-Affective Processes: Curiosity, Doubt, Belief, etc.

(5) *MATHEMATICS.*

(a) *Algebra.*

Lessons.

Ratio and Proportion, Variation, Theory of Indices, Simple Surds, Elementary Theory of Logarithms and their application to arithmetical computation; Quadratic Equations, Theory of Quadratic Functions, Arithmetic and Geometric series and simple series depending on them, Interest and Annuities, Binomial Theorem for a positive integral index and application of the theorem to any rational index. Easy Graphs. Solution of Simultaneous Quadratic Equations, Permutation and Combination, Harder Series, Convergence and Divergence of Series (Elementary Tests). 65

(b) *Trigonometry.*

Measurement of angles, Trigonometric Functions and the relations to one another. Simple Equations, Solution of Triangles, Heights and Distances in one plane. Use of Trigonometric Tables. Sine and Cosine Graphs. Addition and Multiplication Formulæ, Properties of Triangles and Circles connected with them, Inverse Trigonometric Functions, Limits and Approximations, Heights and Distances in different planes, application of Logarithms to Trigonometric Computation. 50

(c) *Geometry.*

Theorems as per Euclid Book II, III 35-39, Book VI, and XI. Construction of circumscribed, inscribed and escribed circles of triangles and regular polygons, Medial section, Construction of triangles from given datasand their division in a given ratio. 54

Properties of Triangles and Circles:

Rectangles in connection with Circles.

If two chords of a circle cut at a point within it, the rectangles contained by their segments are equal.

If two chords of a circle, when produced cut at a point outside it, the rectangles contained by their segments are equal. And each rectangle is equal to the square on the tangent from the point of intersection.

If from a point outside a circle two straight lines are drawn, one of which cuts the circles, and the other meets it, and if the rectangle contained by the whole line which cuts the circle, and the part of it outside the circle is equal to the square on the line which meets the circle, then the line which meets the circle is a tangent to it.

If the vertical angle of a triangle is bisected internally by a straight line which cuts the base, the rectangle contained by the sides of the triangle is equal to the rectangle contained by the segments of the base, together with the square on the straight line which bisects the angle.

If from the verticle angle of a triangle a straight line is drawn perpendicular to the base the rectangle contained by the sides of the triangle is equal to the rectangle contained by the perpendicular and the diameter of the circumcircle.

The rectangle contained by the diagonals of a quadrilateral inscribed in a circle is equal to the sum of the two rectangles contained by its opposite sides.

The Nine-Points Circle. Lessons.

The three medians of a triangle meet in a point, and this point is a point of trisection of each median, and also of the line joining the circumcentre to the orthocentre.

The perpendiculars from the vertices of a triangle on the opposite sides meet in a point, and the distance of each vertex from the orthocentre is twice the perpendicular distance of the circumcentre from the side opposite to that vertex.

The circle through the middle points of the sides of a triangle passes also through the feet of the perpendiculars of the triangle and through the middle points of the three lines joining the orthocentre to the vertices of the triangle.

If a perpendicular drawn from the vertex to the base of a triangle is produced to meet the circumcircle, then the distance of this point of intersection from the base is equal to the distance of the orthocentre of the triangle from the base.

The Analytic Geometry of the Point and the Straight Line.

(d) Practical work 25

(e) Calculus

Differentiation and Integration of Simple Functions (Consult Chapters VI, VII and IX of Jessop's *Elementary Analysis*). 9

(6) *PHYSICS*

The course will include a more detailed study of the matter relating to Physics included in the S S.L.C. syllabus for Elementary Science and in addition, the following :—

Mechanics.—Fundamental units of length, mass and time, and their measurement.

Units of velocity and acceleration.

Relations between displacement, velocity and acceleration of a particle moving in a straight line with constant acceleration.

Resolution and composition of velocities and acceleration: motion down an inclined plane.

Laws of motion: momentum: force: energy: work: power.

Atwood's machine.

Equilibrium of bodies acted on by three or more co-planar forces.

The parallelogram of forces, resolution and compositon of forces in a plane.

Systems of paralled forces. Moment of a force. Moment of a couple: condition of equilibrium of a body under the action of two couples in a plane.

Centre of gravity.

Simple machines.

The simple pendulum treated experimentally: the measurement of "g."

Measurement of time by the pendulum clock.

Comparison of masses by balances, including the common steelyard.

Hooke's Law: spring balances.

Hydrostatics.—Nature of fluid pressure: pressure at a point in a fluid.

Resultant thrust on immersed plane surface.

Principle of Archimedes: its experimental verification.

Floating bodies.

Measurement of specific gravity and comparison of densities by weighing; by the hydrometer: and, in the case of liquids, by balanced columns.

The pressure of a gas: Boyle's Law.

Barometers: manometers: pressure gauges.

Hydraulic press: air pumps: water pumps.

Sound.—Producation and propagation. Wave motion. Reflection and refraction of sound waves.

Velocity in air and its determination.

Musical notes: pitch, quality and intensity.

Vibration of strings and air columns treated experimentally.

Heat.—Temperature and quanity of heat distinguished.

Variation of sizes of bodies with change of temperature: common examples.

Thermometers employing thermal expansion of solids, liquids and gases.

Measurement of thermal expansion.

Thermal expansion of gases: Charles' Law.

Measurement of quantity of heat: units: specific heat.

Simple thermal laws relating to change of state, latent heat.

Calorimetry: practical measurement of specific heat and latent heat.

Vapour pressure and its measurement.

Boiling point and its measurement.

Melting points and boiling points of solutions, simple facts.

Convection of heat: common examples.

Conduction of heat: simple laws and measurements. Definition of conductivity.

Radiation treated simply and experimentally: absorption and reflection of heat: effect of quality of surface on emission, absorption and reflection: practical applications of these facts.

Newton's Law of Cooling: Prevost's Theory of Exchanges. Comparision of specific heats by the method of cooling.

Heat, a form of energy : dynamical equivalent of heat : conservation of energy.
Conversion of heat into work : the working of the steam engine and the internal combustion engine simply explained.

Light.—Rectillinear propagation of light. Shadows. Eclipses. Pinhole camera.
Simple photometry. Inverse square law of illumination. Laws of reflection and refraction : total reflection.
Applications of laws of reflection and refraction to plane and spherical surfaces. Lenses.
Derivation and applications of formulæ connecting positions of object and image in the cases of mirrors and lenses. Real and virtual images. Magnification.
Applications to the following optical instruments :—
Photographic camera : projection lantern : simple magnifier : spectacles : microscope : telescope
Dispersion : variation of refractive index with colour : the spectroscope, emission and absorption spectra : solar spectrum.

Magnetism.—Properties of magnets : magnetic fields : shape of field surrounding straight bar magnets and bent magnets.
Suspended magnet : compass needle.
Earth's magnetic field.
Uniform magnetic fields : field strength : action of magnetic field on magnet in the field.
Definition of unit pole and of unit intensity of magnetic field.
Definition of magnetic moment of a magnet : comparison of magnetic moments and of intensities of magnetic fields : magnetometers (deflection and vibration).
Simple magnetic properties of iron and steel : permanent Magnets : magnetic induction.
Magnetic property of electric current.

Electricity.—Electric currents : existence of electric currents recognised by their magnetic effects.
Definition of unit current strength in terms of magnetic intensity.
The electromagnet.
Galvanometers (moving needle) ; tangent galvanometer.
Conductors and non-conductors.
The idea of electromotive force : the relation of electromotive force in a conductor to current strength : resistance: Ohm's Law.
Comparison of resistances and electromotive forces : Wheatstone's Bridge : the potentiometer.
Heating effects of current : work done by current flowing under electromotive force.
Practical units of electric measurements of current strength, electromotive force, resistance, work and power.
Mutual action between magnets and electric currents, suspended coil galvanometer.
Ammeters and voltmeters.
Faraday's experiments on induced currents : simple qualitative laws of electromagnetic induction.
Simple description of action of dynamo.
Description of action of electric bells, telegraph sounder, microphone and telephone : direct current motor : incandescent filament lamp.

Books recommended for consultation :—

Glazebrook's Cambridge Physical Science Series so far as they relate to the subject matter of the syllabus.

Note.—(i) There will be no practical examination in Physics.
(ii) Candidates for the examination should be required to produce a certificate of having satisfactorily completed a course of practical laboratory work in the subject, signed by the Head of the Intermediate College.
(iii) The course in Physics should consist of two lectures per week of one hour each and one Practical lesson per week of two and a half hours.

(7) *CHEMISTRY*

The laws of chemical combination by weight and by volume.
Boyle's law. Charles' law. Gay Lusac's law of combining volumes.
Atomic theory ; symbols and formulæ. The determination of equivalent weights, and molecular Weights. Valency. Chemical equations and calculations.
Elementry knowledge of chemical changes such as combustion, electrolysis and thermal dissociation ; conditions which influence and determine them and the attendant phenomena.
Colloids and crystalloids, elementary ideas. Dialysis. Diffusion.
Classification of the elements : the periodic system.
History, production, properties and uses of the more important elements and their important compounds :—

Hydrogen, oxygen, hydrogen peroxide, ozone.
Halogens, their hydracids, oxyacids and salts.

Sulphur—allotropy, sulphur dioxide, sulphur trioxide, sulphurous and sulphuric acids, sulphuretted hydrogen, sodium thiosulphate.

Nitrogen—fixation, ammonia, nitrous oxide, nitric oxide nitrogen tetroxide, nitrous and nitric acids.

Phosphorus—allotropic forms, phosphine, phosphorus pentoxide. phosphoric acidse, halides of phosphorus.

Arsenic—arsine, oxides and oxy-acids.

Boron—boron trioxide, boric acid, borax.

Carbon—allotropy; products of destructive distillation of wood and coal, petroleum products, carbon monoxide, dioxide, methane, ethane, ethylene, acetylene, carbon disulphide, carbon tetrachloride, cyanogen, hydrocyanic acid, cyanides, ferrocyanides.

Only properties and uses of methyl and ethyl alcohols, formalin, acetaldehyde, acetone, formic, acetic oxalic, citric, tartaric, stearic, tannic and carbolic acids. Ether, chloroform, iodoform, fats, oils, and carbohydrates.

Silicon, silica and sodium silicate.

Chief sources, properties and uses of the following common metals and of their important compounds:—

Sodium, potassium, copper, silver, gold, magnesium, calcium, barium, zinc, mercury, aluminium, tin, lead, antimony, bismuth, chromium, manganese and iron.

The methods of manufacture of only the following may be indicated:—

Aluminium, iron, gold, lead, sodium hydroxide, sodium carbonate, white lead, sodium hypochlorite, bleaching powder, potassium bichromate, potassium permanganate.

Practical:—

Glass working: cutting, bending and drawing out tubing.

Purification of substances: distillation, crystallisation.

Solubility in general and solubility curves in particular of solids.

Equivalents of metals, magnesium, iron, lead, copper, aluminium.

Acidimetry and alkalimetry: typical methods of salt formation.

Estimation of soluble chlorides in neutral solutions volumetrically.

Oxidation and reduction treated generally with special reference to the use of permanganate and bichromate.

Effect of heat on various types of the more familiar compounds.

Preparation of hydrogen, oxygen, chlorine, hydrogen chloride, ammonia, nitric acid, sulphur dioxide, boric acid, alums, ferrous ammonium sulphate, sodium thiosulphate, potassium nitrate, nitrous oxide, methane, ethyl alcohol by fermentation.

Composition by volume of air, ammonia, sulphur dioxide.

Relative density of oxygen and carbon dioxide.

Simple qualitative analysis. (Only at the end of the course).

Elementary notions about electrolytic dissociation should be given at this stage in the practical classes.

Books recommended for consultation:—

Theory.—Senter's Inorganic Chemistry.
Holmyard's Inorganic Chemistry.

Practical.—Smith's Laboratory Outline of Elementary Chemistry.
Caven's Quantitative Practical and Inorganic Preparations (2 Vols).
Duncliff's Intermediate Practical Chemistry.

Historical Chemistry for outside reading:—Alembic Club Reprints.

Note:—(i) There will be no practical examination in Chemistry.
(ii) Candidates for the examination should be required to produce a certificate of having satisfactorily completed a course of practical laboratory work in the subject, signed by the Head of the Intermediate College.
(iii) The course in Chemistry should consist of two lectures per week of one hour each and one practical lesson per week of two and a half hours.

(8) *BIOLOGY*.

(a) *Elementary Botany*.

(1) A study of the parts of a flowering plant. Root and shoot systems.

Work of the roots. Stem and leaves. Form and structure of the parts as suited to function. An elementary knowledge of transpiration, photo-synthesis, respiration. Behaviour of parts of plants to gravity and light.

Flowers:—Arrangement, parts and their functions, pollen and ovule, cross and self-pollination, fertilisation and dispersal of fruits and seeds.

Life history of the following plants:—

Chlamydomonas, Ulothrix, Spirogyra; Bacteria; Cystopus, Mucor, Agaricus; Riccia, Marchantia, Moss; Adiantum, Selaginella; Cycas.

(b) *Elementary Zoology*.

(1) A study of the important features in the structure, functions and development of the following forms:—

1. Amoeba, 2. Polystomella, 3. Lithocircus, 4. Euglena, 5. Copromonas, 6. Volvox, 7. Monocystis, 8. Paramoecium, 9. Vorticella, 10. Stylonychia, 11. Opalina, 12. Hydra, 13. Obelia, 14. Earthworm, 15. Starfish, 16. Fresh water mussel, 17. Prawn, 18. Cockroach, 19. Amphioxus, 20. Dog fish, 21. Frog, 22. Rabbit.

The practical work will include a thorough examination of the microscopical preparations of the organisms, and their complete dissections and preparations of slides. A knowledge of the skeleton will be required.

(c) *Common Portion*.

Minute structure and divisions of cells and nucleii. Spermatogenesis and oogenesis in frog and earthworm. Reduction, division, and formation of micro and mega-spores in onion.

Food—
(1) Of plants—ordinary plant—beans, cuscuta, sandal.
(2) Of animals, solid, liquid. Derived from plants or animals; consequent adaptations in animals, mouth with teeth or sucking apparatus, weapons for attack, etc.

Defence and attack.—
(1) Plants—Acacia thorns, Nettles, Hairs, Insectivorous plants.
(2) Animals—Claws, Tusks, Shields, Poison, etc.

Interdependence of organisms collectively and individually.
CO_2 from animals used by plants; insects pollinating flowers, and animals dispersing fruits and seeds. Animals depending on plants for food.
Plants depending on plants, leguminous nodules, Nostoc. Lichens, sandal.
Animals depending on animals.
Hermit crab, Sea anemone and crab. Head louse, Flea, Tape worm.
Symbiosis, Parasitism.
Adaptation to Environments.
(1) Plants—Xerophytic, Hydrophytic. Littoral vegetation, Lithophytic.
(2) Animals—Tadpole and frog, web foot in swimming birds, fins, bats, whale, etc.
Colour in animals and plants.

Sex.—
Hermaphrodite
Unisexual { Monœcious / Dioecious } Examples from animals and plants
Polygamous.

Reproduction.—
Vegetative
Parthenogenesis Examples from plants and animals.
Sexual
Alternation of generation.
Races
Varieties
Species
Basis of classification.
Simple examples of cross breeding—Pea, Fowl.
Mendelism—Simple. 1 : 2 : 1 or 3 : 1 ratio
Geographical distribution.
Multiplication of individuals.
Checks.
Struggle for existence.
Natural Selection.
Mutation—Oenothera.
Evolution.
Evidence in support.
Usefulness of a knowledge of Biology.

Books Recommended.

Any of the following:—

1. James G. Needham ... . General Biology.
2. T. J. Parkar ... ... Lessons in Elimentary Biology
3. J. A. Thompson ... ... The Science of Life
4. R. E. Lloyd ... ... An Introduction to Biology
5. T. J. Parkar and W. A. Haswell ... ... A Manual of Zoology

II. INTERMEDIATE EXAMINATION IN SCIENCE.

I. ENGLISH.

Same as for Intermediate Examination in Arts.

II. SECOND LANGUAGE.

(a) Kannada

There shall be one paper and the quantity to be prescribed shall be less than that prescribed for the Intermediate in Arts.

(b) Tamil

Poetry, Prose, Grammar and Composition. The quantity prescribed shall be half that prescribed for Arts in Poetry and Prose.

Poetry—about 450 stanzas.
Prose—about 60 pages (Classical).

(c) *Telugu*

There shall be one paper divided into two parts of which the first shall contain questions on text-books and on grammar and the second shall consist of general subjects for composition on any one of which the candidate shall be required to write a short essay.

(d) *Urdu*

Texts, Grammar and Composition.

(e) *Sanskrit*

(a) Detailed study of books prescribed from time to time.
(b) Elements of practical grammar.
(c) Translation from English into Sanskrit and *vice versa*.

(f) *Persian*

Texts and Translation.

Note.—The standard for any language taken as a Second Language shall be the same for the Intermediate Examination in Science and for the Intermediate Examination in Science leading to Engineering.

III. MATHEMATICS (*compulsory*).

(a) *Algebra*

Lessons

Ratio and proportion, Variation, Theory of Indices, Simple surds. Elementary Theory of Logarithms and their application to Arithmetical computation, Quadratic Equations, Theory of Quadratic Functions, Arithmetic and Geometric series and simple series depending on them, Interest and Annuities, Binomial Theorem for a positive integral index and applications of the theorem to any rational index. Easy graphs ... 50

(b) *Trigonometry*

Measurement of angles, Trigonometric Functions and the relations to one another, Simple Equations, Solution of Triangles, Heights and Distances in one plane, Use of Trigonometric Tables. Sine and Cosine Graphs. ... 35

(c) *Geometry*

Theorems as per Euclid Book II, III 25-39, Book VI; and XI. Construction of circumscribed, inscribed and escribed circles of triangles and regular polygons, Medial Section, Construction of triangles from given data and their division in a given ratio... 40

(d) *Practical work* 25

IV. OPTIONAL SUBJECTS.

(1) ADDITIONAL MATHEMATICS.

(a) *Algebra*

Solution of Simultaneous Quadratic Equations, Permutation and Combination. Convergence and Divergence of Series, Summation of Series. Indeterminate Equations, Partial Fractions ... 25

(b) *Trigonometry*

Addition, Multiplication and Division formulæ, properties of Triangles and Circles connected with them, Inverse Trigonometric Functions, Limits and Approximations, Heights and Distances in different planes, Application of Logarithms to trigonometric computation, Addition and Multiplication of Vectors 25

(c) *Geometry.*

Properties of Triangles and Circles:

Lessons

Rectangles in connection with Circles. 40

If two chords of a circle cut at a point within it, the rectangles contained by their segments are equal.

If two chords of a circle, when produced, cut a ta point outside it, the rectangles contained by their segments are equal. And each rectangle is equal to the square on the tangent from the point of intersection.

If from a point outside a circle two straight lines are drawn, one of which cuts the circle, and the other meets it, and if the rectangle contained by the whole line which cuts the circle and the part of it outside the circle is equal to the square on the line which meets the circle, then the line which meets the circle is a tangent to it.

If the vertical angle of a triangle is bisected internally by a straight line which cuts the base, the rectangle contained by the sides of the triangle is equal to the rectangle contained by the segments of the base, together with the square on the straight line which bisects the angle.

If from the vertical angle of a triangle a straight line is drawn perpendicular to the base, the rectangle contained by the sides of the triangle is equal to the rectangle contained by the perpendicular and the diameter of the circumcircle.

The rectangle contained by the diagonals of a quadrilateral inscribed in a circle is equal to the sum of the two rectangles contained by its opposite sides.

The Nine-Points Circle.

The three medians of a triangle meet in a point, and this point is a point of trisection of each median, and also of the line joining the circumcentre to the orthocentre.

The perpendiculars from the vertices of a triangle on the opposite sides meet in a point, and the distance of each vertex from the orthocentre is twice the perpendicular distance of the circumcentre from the side opposite to that vertex.

The circle through the middle points of the sides of a triangle passes also through the feet of the perpendiculars of the triangle and through the middle points of the three lines joining the orthocentre to the vertices of the triangle.

If a perpendicular drawn from the vertex to the base of a triangle is produced to meet the circumcircle, then the distance of this point of intersection from the base is equal to the distance of the orthocentre of the triangle from the base.

The Analytic Geometry of the Point, the Straight Line, the Circle and the Parabola.

(*d*) *Calculus*

Elements of the Differential and the Integral Calculus (as in C. M. Jessop's *Elementary Analysis*).

(*e*) *Dynamics*

Note.—The preparation of the syllabus has been referred to the Boards of Studies 50.

(*f*) *Tutorial*

(Chiefly in Calculus and Dynamics) 20.

(2) *PHYSICS*

Same as for Intermediate Examination in Arts.

(3) *CHEMISTRY*

Same as for Intermediate Examination in Arts.

(4) *BIOLOGY*

Same as for Intermediate Examination in Arts.

(5) *BOTANY*

1. Living and non-living things and their main features.
Organic and inorganic substances.
Plants and animals—Differences and resemblances—similarity of vital functions such as feeding, respiration, movement, response to stimuli and reproduction.

2. The green leaf.
Its external and internal structure.
Photo-synthesis.
Transpiration.
Leaf form and internal structure, as well suited to carry on the above two functions.
Adaptations to facilitate and check transpiration; leaf adjustments to light, phototropism. Arrangement of the leaves on the Plant. Struggle for light among Plants. Climbing plants and epiphytes.
General leaf forms. Stipules and their work. Modifications of leaves and stipules.

3. Root. Its external form, internal structure; work of roots—absorption and fixation—root cap, root hairs, region of root hairs, work of root hairs; Osmosis.
Root pressure. Study of the soil. Its structure and nature of the soil in relation to the water contents.
Branching of the roots, elongation and growth of roots in thickness. Different kinds of roots.
Modifications of roots. Response of roots to gravity, light and water.

4. Stem. Internal structure; work of the stem—supporting and conducting. Path of the sap current; intercellular spaces, lenticels; increase of stem in thickness; cork formation, sap wood and heart wood; modification of stems. Response of the stem to gravity and light.
Stems of water plants.

5. Flowers. Parts of a flower; functions of different parts; Pollen grains; pollen tube; ovule; egg cell; fertilisation.
Seed formation. Parts of a seed. Arrangements of the parts of a flower; insect visitors; cross- and self-pollination.

Advantages of cross pollination; adaptations for cross pollination; wind pollination and inconspicuous flowers. Inflorescences. Seeds; fruits; kinds of fruits; seed and fruit dispersal and its advantages; Struggle for existence. Survival of the fittest; variety, species, heredity and evolution.

Study of the following families.—Anonaceæ, Magnoliaceæ, Malvaceæ, Leguminosæ, Myrtaceæ, Rubiaceæ, Compositeæ, Convolvulaceæ, Solanaceæ, Acanthaceæ, Labiateæ, Euphorbiaceæ Liliaceæ, Amaryllidæ, Palmæ.

Some plant products.—Starch, Oils, Sugars, Alkaloids, Gums, Resins, Contchouc, Fibres, the plants and the parts of the plant producing them.

6. Apex of the stem and the root. Moristem, Cell structure. Cell division, changes seen in the cell contents and the nature of the cell wall.

Life history of.—Chlamydomonas, Structure, Locomotion, all the life functions carried out by the single cell. A brief account of Volvacales—Origin of sex, increase in plant body and division of labour. Origin of Soma. Ulothrix, Spirogyra, Fucus, Simplest land plants, such as Liverworts; Mosses; Ferns; Lycopods, Selaginella and Cycas. Seed plants.

7. Bacteria, Structure and life history, Fermentation, Enzymes, Symbiosis, Pathogenic Bacteria, Fungi—Saprophytes, Parasites. Mucor, Phytophthora, Yeast plants. Fermentations; Parasitic flowering plants, Insectivorous plants.

Practical Work.—Students are expected to examine with hand lens the external features of all the plants and to be able to refer the plants to their families. They should be able to prepare free-hand sections of the various parts of the plant body for microscopic examination and identify the prepared slides of the forms mentioned in Paras 6 and 7. Special attention must be given to the class experimental demonstrations of the various physiological functions of the plant organs.

Text-books.—

(1) A Text-book of Botany by Strasburger.
(2) Elements of Plant Biology by Tansley.
(3) Text-book of Botany by Ganoug, Parts I and II.
(4) Handbook of Botany for India by K. Rangachari.
(5) Botany for Students of Medicine and Pharmacy by Fritch and Salisbury.

Note.—The course in Botany shall consist of two lectures per week of one hour each, and practical lesson of 2½ hours per week.

(6) ZOOLOGY.

A study of important features in the structure, habits, life history and mutual relations of the leading types included in the following phyla:—Protozoa, Cœlenterata, Platyhelminthes, Nematoda, Annelida, Echimodermata, Arthropoda, Mollusca and Vertebrata. *The human parasites and animals of economic importance will receive greater attention.*

The practical work includes a microscopical examination of the organisms; specially prepared slides to illustrate parts or entire structures of the types; dissection of the earthworm, leech, cockroach, fish, frog, lizard, pigeon and rabbit so as to illustrate the principal anatomical characters. A complete examination of the external characteristics of the Jelly fish, Sea Anemone, Corals, tape and round worms, a marine worm, Centipede, Scorpion, Mosquito, House fly, Flea, prawn, crab, fresh water mussel, pond snail, sepia and specimens of echinodermata, together with a general acquaintance with the skeletal features of the vertebrate types, is included. Attention of students is to be drawn to the life history of the mosquito and fly.

The practical examination will require the candidates to dissect the types referred to above, besides examination and simple preparation of slides and identification of material illustrative of the systems of organs of the different forms.

The above syllabus is amply covered by the following books any *one* of which may be prescribed for study:—

1.	J. Graham Kerr	Zoology for Medical Students.
2.	A. E. Shipley and E. W. Mac Bride	A Text-book of Zoology.
3.	J. A. Thompson	Outlines of Zoology.
4.	Alexander Meek	Essentials of Zoology.
5.	R. W. Hegner	College Zoology.
6.	Hertwig and Kingsley	A Manual of Zoology.
7.	H. Osborn	Economic Zoology

Note.—The course in Zoology shall consist of two lectures per week of one hour each and practical lesson of 2½ hours per week.

(7) GEOLOGY.

(a) *Physiography.*

An elementary course of lectures on the following:—

The Earth as a planet, its general relations to the other members of the Solar System. Hypothesis as to the origin of the Earth; form, size and density of the Earth; its movements and effects.

The Atmosphere and the Hydrosphere—General considerations such as their composition, temperature and movements. The lithosphere—the chief constituents of the Earth's crust. Condition of the interior of the Earth.

Agents of Geological Change.—The hypogene and epigene agents, manner and results of their action especially as influencing earth sculpture.

Climate, their causes and distribution; glacial epochs.

4f

(b) Crystallography and Mineralogy.

Symmetry; planes and axes of symmetry; laws of crystallography; the common holohedral crystal forms and combinations; Weiss and Naumann's notations.

The chief characteristics of the most important rock forming minerals; occurrence and alteration products.

(c) Petrology.

Origin and classification of all the more important types of rocks; their composition and alteration; general principles of Metamorphism.

Mode of occurrence and distribution of rock types in Mysore.

(d) Structural and Field Geology.

Elementary knowledge of structural features exhibited by rock masses such as bedding, dip, strike, folds, faults, cleavage, foliation and joints; construction and interpretation of simple geological maps and sections.

Relation between geological structure and scenery, water supply.

(Geological excursion for at least a fortnight is essential.)

(e) Stratigraphy and Palæontology.

Stratigraphical classification; the meaning of unconformity and overlap; imperfection of the geological record; fossils, their mode of formation and value in Geology and also in the Biological sciences, the general characteristics of the great systems of stratigraphy in Europe; elementary knowledge of the Geology of India with special reference to the geological history of Mysore; the order of succession of animal and plant life on the surface of the globe.

Practical Work.—Preparation and interpretation of physical and geological maps; and the drawing of sections across them. Identification and description of minerals, rocks and fossils.

Text-books recommended.—

(1) A. Geikie's Class Book of Geology.
(2) Rutley's Mineralogy (Revised by Read).
(3) Harker's Petrology for Students.
(4) Geological History of Mysore by Dr. Smeeth.

Note—The course in Geology shall consist of two lectures per week of one hour each and practical lesson of 2½ hours per week.

III. INTERMEDIATE EXAMINATION IN SCIENCE.

(leading to Medicine.)

1. *English*

One paper on Composition and Texts for non-detailed study. This shall be identical with the first paper in English for Intermediate in Arts.

2. *Mathematics*

Same as for Intermediate Examination in Science—Mathematics (compulsory).

3. *Physics*

Same as for Intermediate Examination in Arts.

4. *Chemistry*

Same as for Intermediate Examination in Arts.

Note.—There will be a Practical examination in Physics and Chemistry.

5. *Botany*

Same as for Intermediate Examination in Science.

6. *Zoology*

Same as for Intermediate Examination in Science.

Note.—There shall be '*Viva Voce*' in Botany and Zoology.

IV. INTERMEDIATE EXAMINATION IN SCIENCE.

(leading to Engineering.)

1. *ENGLISH*

One paper on Composition and Texts for non-detailed study. This shall be identical with the first paper in English for Intermediate in Arts.

2. *SECOND LANGUAGE*

There shall be one paper and the quantity to be prescribed shall be less than that prescribed for the Intermediate Examination in Arts.

1. *Kannada*
2. *Tamil*
3. *Telugu*
4. *Urdu*
5. *Sanskrit*
6. *Persian*

Same as for Intermediate Examination in Science.

3. *MATHEMATICS*

Same as for Intermediate Examination in Arts.

4. *PHYSICS*

Same as for Intermediate Examination in Arts.

5. *CHEMISTRY*

Same as for Intermediate Examination in Arts.

6. *GEOLOGY*

Same as for Intermediate Examination in Science.

SCHEME OF EXAMINATION.

I. INTERMEDIATE EXAMINATION IN ARTS.

I. ENGLISH

			Max. Marks
1.	Composition and Texts for non-detailed study....	1 paper of 3 hours ...	100
2.	Texts for detailed study ...	" ...	100

II. SECOND LANGUAGE.

Kannada.

1.	Texts and Grammar	1 paper of 3 hours ...	100
2.	Composition	" ...	100

Tamil.

1.	Texts and Grammar	1 paper of 3 hours ...	100
2.	Composition	" ...	100

Telugu.

1.	Texts and Grammar	1 paper of 3 hours ...	100
2.	Composition	" ...	100

Urdu.

1.	Texts and Grammar	1 paper of 3 hours ...	100
2.	Composition	" ...	100

Sanskrit.

1.	Texts and Grammar	1 paper of 3 hours ...	100
2.	Translation	" ...	100

Persian.

1.	Texts and Grammar	1 paper of 3 hours ...	100
2.	Translation	" ...	100

French.

1.	Translation from prepared Text-book and Grammar	1 paper of 3 hours ...	100
2.	Translation from unseen Prose Writers and Composition	" ...	100

III. OPTIONAL SUBJECTS.

(a) SELECTED LANGUAGE

			MAX. MARKS
(1) *Old and Middle Kannada.*			
1. Texts and Grammar	...	1 paper of 3 hours	100
2. Composition	...	"	100
(2) *Modern Kannada.*			
1. Texts and Grammar	...	1 paper of 3 hours	100
2. Composition	...	"	100
(3) *Tamil.*			
1. Texts and Grammar	...	1 paper of 3 hours	100
2. Composition	...	"	100
(4) *Telugu.*			
1. Texts and Grammar	...	1 paper of 3 hours	100
2. Composition	...	"	100
(5) *Urdu.*			
1. Texts and Grammar	...	1 paper of 3 hours	100
2. Composition	...	"	100
(6) *Sanskrit.*			
1. Texts and Grammar	...	1 paper of 3 hours	100
2. Translation	...	"	100
(7) *Arabic*			
1. Texts and Grammar		1 paper of 3 hours	100
2. Translation		"	100
(8) *Persian*			
1. Texts and Grammar		1 paper of 3 hours	100
2. Translation		"	100
(9) *French*			
1. Translation from prepared Text-book and Grammar		1 paper of 3 hours	100
2. Translation from unseen Prose writers and Composition		"	100

(b) *ANCIENT HISTORY (including Indian History)*

1. History of Greece and Rome		1 paper of 3 hours	100
2. History of India to 1206 A.D.		"	100

(c) *MODERN HISTORY (including Indian History)*

1. History of England from 1485 A.D.		1 paper of 3 hours	100
2. History of India from 1206 A.D.		"	100

(d) *LOGIC*

1. First paper (Deductive Logic)		1 paper of 3 hours	100
2. Second paper (Inductive Logic)		"	100

(e) *MATHEMATICS*

1. Algebra and calculus		1 paper of 3 hours	100
2. Trigonometry and Geometry		"	100

(f) *PHYSICS*

1. First paper		1 paper of 3 hours	100
2. Second paper		"	100

(g) *CHEMISTRY*

1. First paper		1 paper of 3 hours	100
2. Second paper		"	100

(h) *BIOLOGY*

1. First paper : Theory		1 paper of 3 hours	100
2. Second paper*		"	100

Note—The question of having a practical examination in Biology has been referred back to the Board of Studies in Natural Science and the Faculty of Science for further consideration.

II. INTERMEDIATE EXAMINATION IN SCIENCE.

I. ENGLISH.

			MAX. MARKS
1.	Composition and Texts for non-detailed study ...	1 paper of 3 hours	... 100
2.	Texts for detailed study ...	"	... 100

II. SECOND LANGUAGE.

Kannada :—Texts and Composition ...	1 paper of 3 hours	...	100
Tamil :—Texts and Composition ...	1 paper of 3 hours	...	100
Telugu .—Texts and Composition ..	1 paper of 3 hours	..	100
Urdu .—Texts, Grammar and Composition ...	1 paper of 3 hours	...	100
Sanskrit .—Texts, Grammar and Translation ..	1 paper of 3 hours	...	100
Persian .—Texts, Grammar and Translation ..	1 paper of 3 hours	...	100

III. MATHEMATICS (compulsory)

Mathematics	1 paper of 3 hours	... ...	100

IV. OPTIONAL SUBJECTS

(*1*) *Additional Mathematics*

1.	Algebra, Trigonometry and Geometry ...	1 paper of 3 hours	....	...	100
2.	Calculus and Dynamics ...	"	...	...	100

(*2*) *Physics*

1.	First paper ...	1 paper of 3 hours	...	...	100
2.	Second paper ...	"	...	...	100

(*3*) *Chemistry*

1.	First paper ...	1 paper of 3 hours	...	...	100
2.	Second paper ...	"	...	...	100

(*4*) *Biology*

1.	First paper : Theory ...	1 paper of 3 hours	...	...	100
2.	Second paper* ...	"	...	...	100

(*5*) *Botany*

1.	First paper : Theory ...	1 paper of 3 hours	...	...	100
2.	Second paper* ...	"	...	...	100

(*6*) *Zoology*

1.	First paper : Theory ...	1 paper of 3 hours	...	...	100
2.	Second paper* ...	"	...	...	100

(*7*) *Geology*

1.	First paper : Theory ...	1 paper of 3 hours	...	..	100
2.	Second paper* ...	"	...	...	100

III. INTERMEDIATE EXAMINATION IN SCIENCE.

(leading to Medicine.)

1. ENGLISH

Composition and Texts for non-detailed study ...	1 paper of 3 hours	... ...	100

2. MATHEMATICS

Mathematics ...	1 paper of 3 hours	... ...	100

3. PHYSICS

1.	First paper ...	1 paper of 3 hours	... ...	75
2.	Second paper ...	"	... ...	75
3.	Practical ...	...	... ...	50

4. CHEMISTRY

			MAX. MARKS
1. First paper	...	1 paper of 3 hours	75
2. Second paper	...	"	75
3. Practical	...	...	50

5. BOTANY

			MAX. MARKS
1. First paper : Theory	...	1 paper of 3 hours	100
2. Second paper*	...	"	100
3. *Viva Voce*	...	15 minutes	50

6. ZOOLOGY

			MAX. MARKS
1. First paper : Theory	...	1 paper of 3 hours	100
2. Second paper*	...	"	100
3. *Viva Voce*	...	15 minutes	50

Note.—(1) For purposes of tabulation, the maximum total marks in Botany and Zoology, *viz.*, 250, will be converted on the basis of 200 maximum.

*(2) The question of having a Practical Examination in Natural Science Subjects has been referred back to the Board of Studies in Natural Science and the Faculty of Science for further consideration.

IV. INTERMEDIATE EXAMINATION IN SCIENCE.

(leading to Engineering).

1. ENGLISH

			MAX. MARKS
Composition and Texts for non-detailed study	...	1 paper of 3 hours	100

2. SECOND LANGUAGE

			MAX. MARKS
Text and Composition or Translation	...	1 paper of 3 hours	100

3. MATHEMATICS

			MAX. MARKS
1. Algebra and Calculus	...	1 paper of 3 hours	100
2. Trigonometry and Geometry.		"	100

4. PHYSICS

			MAX. MARKS
1. First paper	...	1 paper of 3 hours	100
2. Second paper	...	"	100

5. CHEMISTRY

			MAX. MARKS
1. First paper	...	1 paper of 3 hours	100
2. Second paper	...	"	100

6. GEOLOGY

			MAX. MARKS
1. First paper : Theory	...	1 paper of 3 hours	100
2. Second paper*	...	"	100

Note.—The question of having a Practical Examination in Geology has been referred back to the Board of Studies in Natural Science and the Faculty of Science for further consideration.

II. (i) Proposition.—That the following Courses of Study and Schemes of Examination for the M.A. and M.Sc. Degrees in Mathematics be adopted :—

I. M.A. Course in Mathematics.

The course shall be one of two years after passing the B.A. Degree Examination with Mathematics as one of the two B.A. Optional Subjects and shall comprise the following :—

(A) *Compulsory* (six papers)—

(*i*) *Analytical Geometry of two and three dimensions :* (one paper of three hours' duration, Maximum Marks 150).

(*ii*) (*Elementary*) *Higher Plane Curves and Modern Pure Geometry* : (one paper of three hours' duration, Maximum Marks 150).
(*iii*) *Advanced Calculus* : (one paper of three hours' duration, Maximum Marks 150).
(*iv*) *Infinite Series and Cauchy's Theorem* (Elementary) : (one paper of three hours' duration, Maximum Marks 150).
(*v*) *Differential Geometry* : (one paper of three hours' duration, Maximum Marks 150).
(*vi*) *Differential Equations* : (one paper of three hours' duration, Maximum Marks 150).

(B) OPTIONAL (two papers)—Any *two* of the special optionals :—

(1) Statistics, (2) Theory of Probability, (3) Mathematical Economics, (4) Mental, Social and Educational Measurements, (5) Dynamics, (6) Astronomy, (7) Higher Plane Curves, (8) Functions of a Complex Variable (Elementary), (9) Linear Differential Equations, (10) Elliptic Functions, (11) Attractions and Potentials.
(One paper of three hours' duration in each optional, Maximum Marks 150).

The *minimum units* of work shall be fixed at 600, distributed as under :—

(*i*) 60 'lecture' hours, and
(*ii*) 15 tutorial hours } for the subjects of each paper.

II. M.Sc. Course in Mathematics.

The M.Sc. course in Mathematics shall be one of two years after passing the B.Sc. Degree Examination.

The course shall comprise—

A. COMPULSORY SUBJECTS—

Four papers of three hours' duration each. Maximum Marks 150 for each paper.
(1) Functions of Real Variables.
(2) Differential Geometry.
(3) Modern Analysis including Cauchy's Theorem.
(4) Introduction to Mathematical Physics.

B. OPTIONAL SUBJECTS—

(*a*) *Pure Mathematics.*—One of the following at the option of the candidate :—

Two papers of three hours' duration each. Maximum Marks 150 for each paper.
(1) Theory of Functions of a Complex Variable.
(2) Projective Geometry.
(3) Non-Euclidean Geometry.
(4) Linear Differential Equations.
(5) Elliptic Functions.
(6) Theory of Numbers.
(7) Theory of Probability.
(8) Theory of Integral Equations.

(*b*) *Applied Mathematics.*—One of the following at the option of the candidate :—

Two papers of three hours' duration each. Maximum Marks 150 for each paper.
(1) Electro-magnetic Theory.
(2) Relativity.
(3) Radiation including Quantum Theory.
(4) Dynamics.
(5) Hydro-dynamics.
(6) Kinetic Theory of Gases.
(7) Theory of Elasticity.
(8) Thermo-dynamics.
(9) Astro-physics.
(10) Theory of heat conduction.

The *minimum units* of work shall be fixed at 600 for the whole course (calculated at 12 hours a week for 50 weeks), distributed as under :—

(*i*) 60 *lecture* hours, and
(*ii*) 15 *tutorial* hours. } or 75 hours for the subjects of each paper.

Carried.

(ii) *Resolved* that the following amendment regarding the minima for a pass in the M.A., and M.Sc. Degrees in Mathematics be referred to the Board of Studies in Mathematics and the Faculties of Arts and Science for consideration and report.

A. "I. A candidate shall be declared to have passed the examination for the degree of Master of Arts in Mathematics if he obtains not less than 30 per cent of the total maximum number of marks in each of the Compulsory and Optional Groups and also not less

than 25 per cent in each of the two Optionals, and not less than 40 per cent of the total maximum number of marks for the whole examination.

II. Such of the successful candidates as obtain not less than 60 per cent of the total maximum number of marks shall be ranked in the First Class, those who obtain 50 per cent or more, but less than 60 per cent shall be ranked in the Second Class, and the rest shall be arranged in alphabetical order in the Third Class."

(*B*) "I. A candidate shall be declared to have passed the examination for the degree of Master of Science in Mathematics if he obtains not less than 30 per cent of the total maximum number of marks in the Compulsory Group, and not less than 30 per cent in each of the two divisions of the Optional Group, and not less than 40 per cent of the total maximum number of marks for the whole examination.

II. Such of the successful candidates as obtain not less than 60 per cent of the total maximum number of marks shall be ranked in the First Class, those who obtain 50 per cent or more, but less than 60 per cent shall be ranked in the Second Class, and the rest shall be arranged in alphabetical order in the Third Class."

III. **Proposition.**—That the following scheme regarding the Corresponding Language or Languages for each Selected Language in the Intermediate in Arts list be adopted :—

Intermediate in Arts.

Selected Language in the I.A. Scheme	Corresponding Language in the S.S.L.C. Scheme
Old and Middle Kannada, Modern Kannada	Kannada
Tamil	Tamil
Telugu	Telugu
Urdu	Urdu
French	French
German	German.
Sanskrit, Pali, Prakrit	Sanskrit
Persian	Persian
Arabic	Arabic
Latin	Latin
Greek	Greek

Carried.

B. M. SRIKANTIA,
Registrar.

APPENDIX.

DETAILED COURSES OF STUDY.

INTERMEDIATE EXAMINATION IN ARTS.

I. ENGLISH.

The texts for non-detailed study shall be two in number, and none set for any one examination shall be repeated within three years.

Certain of the set books which have to be studied in detail may be retained from year to year.

The books for detailed study shall include one play of Shakespeare, and texts in prose and poetry.

There shall be two papers on English Language and Literature. The first paper shall be called the composition paper and shall consist partly of such tests as epitomisation, and expansion, and partly of subjects for composition drawn from the subject matter of the texts prescribed for non-detailed study. The second paper shall be on the texts set for detailed study.

In both papers the number of questions set shall be larger than the number the candidate is required to answer.

All papers in the examination shall be so set that candidates shall be able to obtain full marks without answering questions relating to purely literary criticism or scholarship.

II. LANGUAGES.

(1) *Kannada.*

There shall be two papers, one on prescribed texts and grammar and the second on composition.

The courses of study shall consist of poetry and prose, both ancient and modern, and drama with grammar for the text paper and prescribed modern prose books for non-detailed study in connection with the composition paper.

(2) *Tamil.*

(*a*) Poetry—about 300 stanzas,
(*b*) Prose—about 120 pages of Classical Prose,
(*c*) Grammar, and
(*d*) Composition—about 200 pages of prose for non-detailed study.

(3) *Telugu.*

There shall be two papers, one on Telugu language and the other on composition. The first paper shall consist of questions on the text-books prescribed and on the grammar and idiom of the language and the second paper shall consist of a general subject for composition in which the candidate will be required to write short essays on any two of such subjects.

The books to be set under this head shall ordinarily include the following :—

(1) One selection from the Mahabharata or other early classic (Prachina Kavulu).
(2) Two selections from mediæval poets (Prabandha Kavulu).
(3) A drama or a piece of modern poetry.
(4) A modern prose work.

The candidates are expected to show an acquaintance with the history of literature so far as it is represented in the prescribed text-books and also with the elements of grammar, including the elements of prosody and rhetoric of the language.

(4) *Sanskrit.*

(*a*) Detailed study of books prescribed from time to time.
(*b*) Grammar and Prosody as in Macdonell's "Sanskrit Grammar for Beginners" or Kale's "Smaller Sanskrit Grammar."
(*c*) Translation of unseen passages from Sanskrit into English and *vice versa.*

(5) *Urdu.*

Texts and Grammar.
Composition (Essay Writing).

(6) *Persian.*

Same as for Urdu.

(7) *French.*

The full Grammar of Modern French as now taught in the University Entrance and First Year B.A., classes.

The rudiments of French Prosody in connection with the reading of easy poetical texts.

Two text-books, one easy and one more difficult by prose-writers to be studied during the full course. A text-book of easy poetry for the Senior Intermediate.

III. OPTIONAL SUBJECTS.

(1) *A SELECTED LANGUAGE.*

(*a*) *Old and Middle Kannada.*

Same as for Kannada taken as Second Language.

(*b*) *Modern Kannada.*

Same as for Kannada taken as Second Language.

(*c*) *Tamil.*

Same as for Tamil taken as Second Language.

(*d*) *Telugu.*

There shall be two papers, one on Telugu language and the other on translation. The first paper shall consist of questions on the text-books prescribed and on the grammar and idiom of the language and the second paper shall consist of translation from Telugu into English and *vice versa.*

The books to be set under this head shall include the following :—

(1) One selection from the Mahabharata or other early classic.

(2) One selection from the Mediæval poets or a drama.
(3) One modern prose work.

The candidates are expected to show an acquaintance with the elements of grammar, including the elements of prosody and rhetoric of the language.

(e) Urdu.

Prose and Poetry.
Grammar, Rhetoric and Prosody.
Elementary knowledge of Literature.

(f) Sanskrit.

(a) Detailed study of books to be prescribed from time to time.
(b) Grammar and History of Sanskrit Language including the study of a selected portion of the *Siddhanta-Kaumudi*.
(c) History of Classical Literature.

(g) Arabic.

Same as for Urdu.

(h) Persian.

Same as for Urdu.

NOTE.—When a selected language is offered as one of the subjects, the standard of examination shall not be lower than that for the same language offered as a second language. (Resolution of the Faculty of Arts, dated the 7th May 1927.)

When a selected language is offered as one of the subjects for the Intermediate Examination in Arts, it shall be of the same standard as that of the Second Language. (Resolution of the Faculty of Science, dated the 7th May 1927.)

(2) *ANCIENT HISTORY (including Indian History).*

History of Greece to the death of Alexander the Great and History of Rome to the death of Augustus, and History of India to 1206 A.D.

The following books are recommended to indicate the scope of the subjects :—

(1) Edmunds' or Bury's (abridged) History of Greece.
(2) Well's or Shuckburgh's History of Rome.
(3) V. A. Smith's (Oxford) History of India or Longman's History of India for the Intermediate classes.

(3) *MODERN HISTORY (including Indian History)*

History of England from 1485 A.D., with special reference to the growth of the Empire and of English political institutions, and History of India from 1206 A.D.

The scope of the subjects shall be as indicated in

(1) Warner and Marten's 'Ground Work of British History,' Masterman's History of the British Constitution, and Egerton's History of the Growth of the British Empire.
(2) Same as mentioned in (3) under Ancient History.

(4) *LOGIC INCLUDING ELEMENTARY PSYCHOLOGY OF REASONING PROCESSES*

DEDUCTIVE LOGIC FOR THE JUNIOR INTERMEDIATE

1. The Definition of Logic. The problem, aim and scope of Logic. The relation of Logic to Psychology. Thought and Language. The Division of Logic into Formal and Material.
2. Classification of Terms. Denotation and Connotation. Predicables. Definition. Division. Classification. Description.
3. Nominalism, Conceptualism, Realism.
4. Judgments or propositions: Categorical, Hypothetical, Disjunctive. Logical forms of propositions. Import of propositions. Opposition of propositions. Conversion, Obversion, Contraposition, Inversion, Modality.
5. Inferences: Immediate and Mediate; Deductive and Inductive.
6. Syllogism: Nature, method and rules of syllogistic reasoning. Moods and Figures.
7. Enthymemes and Sorites.
8. Direct and Indirect Reduction of Arguments.
9. Hypothetical and Disjunctive Arguments.
10. Dilemma.
11. Fallacies pertaining to Deduction.
12. Laws of Thought.

(1)

INDUCTIVE LOGIC FOR THE SENIOR INTERMEDIATE.

1. Induction: Nature and Presuppositions of Inductive Reasoning. The relation of Induction to Deduction.
2. Meaning and Implications of the Principles of Causality and the Uniformity of Nature. Proof and Discovery.
3. Observation and Experiment. Methods of Induction. Value of Negative Instances.
4. Generalisation. Hypothesis. Explanation. Classification.
5. Fallacies pertaining to Induction.
6. Chance and Probability. Statistical Method.
7. Aims and Ideals of Science. The Scientific Attitude of Mind.
8. Limitations of Science.
9. Method of Social Sciences.

Note.—The study of Logic, both Deductive and Inductive, should be accompanied by a knowledge of the Psychology of the Reasoning Processes.

1. The Chief Cognitive and Accessory Processes.
2. The Sensory Basis of Knowledge.
3. The Formation of Concepts.
4. Analysis of processes involved in Judgments and Inferences.
5. Meaning and its Relation to action and Language.
6. Unconscious Elements in Reasoning: Prejudice, Sentiment, Intuition.
7. Thought and its Relation to Conative-Affective Processes: Curiosity, Doubt, Belief, etc.

(5) *MATHEMATICS*

(a) *Algebra* — Lessons.

Ratio and Proportion, Variation, Theory of Indices, Simple Surds, Elementary Theory of Logarithms and their application to arithmetical computation, Quadratic Equations, Theory of Quadratic Functions, Arithmetic and Geometric series and simple series depending on them, Interest and Annuities, Binomial Theorem for a positive intergal index and applications of the theorem to any rational index. Easy Graphs. Solution of Simultaneous Quadratic Equations, Permutation and Combination, Harder Series, Convergence and Divergence of Series (Elementary Tests). — 65

(b) *Trigonometry*

Measurement of angles, Trigonometric Functions and the relations to one another. Simple Equations, Solution of Triangles, Heights and Distances in one plane. Use of Trigonometric Tables. Sine and Cosine Graphs. Addition and Multiplication Formulæ, Properties of Triangles and Circles connected with them, Inverse Trigonometric Functions, Limits and Approximations, Heights and Distances in different planes, Application of Logarithms to Trigonometric Computation. — 50

(c) *Geometry*

Theorems as per Euclid Book II, III 35-39, Book VI, and XI (will be expanded in the final form of the syllabus). Construction of circumscribed, inscribed and escribed circles of triangles and regular polygons, Medial section, Construction of triangles from given data and their division in a given ratio. Properties of triangles and Circles as in the present Entrance Syllabus and the Analytic Geometry of the Point and the Straight Line. — 54

(d) *Practical work* — 25

(e) *Calculus*

Differentiation and Integration of Simple Functions (consult Chapters VI, VII and IX of Jessop's *Elementary Analysis*). — 9

(6) *PHYSICS*

The course will include a more detailed study of the matter relating to Physics included in the S.S.L.C. syllabus for Elementary Science and, in addition, the following:—

Mechanics.—Fundamental units of length, mass and time, and their measurement.

Units of velocity and acceleration.

Relations between displacement, velocity and acceleration of a particle moving in a straight line with constant acceleration.

Resolution and composition of velocities and acceleration: motion down an inclined plane.

Laws of motion: momentum: force: energy: work: power.
Atwood's machine.
Equilibrium of bodies acted on by three of more co-planar forces.
The parallelogram of forces: resolution and composition of forces in a plane.
Systems of parallel forces. Moment of a force. Moment of a couple: condition of equilibrium of a body under the action of two couples in a plane.
Centre of gravity.
Simple machines.
The simple pendulum treated experimentally: the measurement of "g."
Measurement of time by the pendulum clock.
Comparison of masses by balances, including the common steelyard.
Hooke's Law: spring balances.

Hydrostatics.—Nature of fluid pressure: pressure at a point in a fluid.
Resultant thrust on immersed plane surface
Principle of Archimedes: its experimental verification.
Floating bodies.
Measurement of specific gravity and comparison of densities by weighing; by the hydrometer; and, in the case of liquids, by balanced columns.
The pressure of a gas: Boyle's Law.
Barometers: manometers: pressure gauges.
Hydraulic press: air pumps: water pumps.

Sound.—Production and propagation. Wave motion. Reflection and refraction of sound waves.
Velocity in air and its determination.
Musical notes: pitch, quality and intensity.
Vibration of strings and air columns treated experimentally.

Heat.—Temperature and quantity of heat distinguished.
Variation of sizes of bodies with change of temperature: common examples.
Thermometers employing thermal expansion of solids, liquids and gases.
Measurement of thermal expansion.
Thermal expansion of gases: Charles' Law.
Measurement of quantity of heat: units: specific heat.
Simple thermal laws relating to change of state, latent heat.
Calorimetry: practical measurement of specific heat and latent heat.
Vapour pressure and its measurement.
Boiling point and its measurement.
Melting points and boiling points of solutions, simple facts.
Convection of heat: common examples.
Conduction of heat: simple laws and measurements. Definition of conductivity.
Radiation treated simply and experimentally: absorption and reflection of heat: effect of quality of surface on emission, absorption and reflection: practical applications of these facts.
Newton's Law of Cooling: Prevost's Theory of Exchanges. Comparison of specific heats by the method of cooling.
Heat a form of energy: dynamical equivalent of heat: conservation of energy.
Conversion of heat into work: the working of the steam engine and the internal combustion engine simply explained.

Light.—Rectilinear propagation of light. Shadows. Eclipses. Pinhole camera.
Simple photometry. Inverse square law of illumination. Laws of reflection and refraction: total reflection.
Applications of laws of reflection and refraction to plane and spherical surfaces. Lenses.
Derivation and applications of formulæ connecting positions of object and image in the cases of mirrors and lenses. Real and virtual images. Magnification.
Applications to the following optical instruments:—
Photographic camera: projection lantern: simple magnifier: spectacles: microscope: telescope. Dispersion: variation of refractive index with colour: the spectroscope, emission and absorption spectra: solar spectrum.

Magnetism.—Properties of magnets: magnetic fields: shape of field surrounding straight bar magnets and bent magnets.
Suspended magnet: compass needle.
Earth's magnetic field.
Uniform magnetic fields: field strength: action of magnetic field on magnet in the field.
Definition of unit pole and of unit intensity of magnetic field.
Definition of magnetic moment of a magnet: comparison of magnetic moments and of intensities of magnetic fields: magnetometers (deflection and vibration).

Simple magnetic properties of iron and steel: permanent magnets: magnetic induction. Magnetic property of electric current.

Electricity.—Electric currents: existence of electric currents recognised by their magnetic effects.

Definition of unit current strength in terms of magnetic intensity.
The electromagnet.
Galvanometers (moving needle); tangent galvanometer.
Conductors and non-conductors.
The idea of electromotive force: the relation of electromotive force in a conductor to current strength: resistance: Ohm's Law.
Comparison of resistances and electromotive forces: Wheatstone's Bridge: the potentiometer.
Heating effects of current: work done by current flowing under electromotive force.
Practical units of electric measurements of current strength, electromotive force, resistance, work and power.
Mutual action between magnets and electric currents: suspended coil galvanometer.
Ammeters and voltmeters.
Faraday's experiments on induced currents: simple qualitative laws of electromagnetic induction.
Simple description of action of dynamo.
Description of action of electric bells, telegraph sounder, microphone and telephone: direct current motor: incandescent filament lamp.

Books recommended for consultation:—

Glazebrook's Cambridge Physical Science Series so far as they relate to the subject matter of the syllabus.

Note.—(i) There will be no practical examination in Physics.

(ii) Candidates for the examination should be required to produce a certificate of having satisfactorily completed a course of practical laboratory work in the subject, signed by the Head of the Intermediate College.

(iii) The course in Physics should consist of two lectures per week of one hour each and one Practical lesson per week of two and a half hours.

(7) *CHEMISTRY.*

The laws of chemical combination by weight and by volume.
Boyle's law. Charles' law. Gay Lusac's law of combining volumes.
Atomic theory; symbols and formulæ. The determination of equivalent weights, and molecular weights. Valency. Chemical equations and calculations.
Elementary knowledge of chemical changes such as combustion, electrolysis and thermal dissociation; conditions which influence and determine them and the attendant phenomena.
Colloids and crystalloids, elementary ideas. Dialysis. Diffusion.
Classification of the elements: the periodic system.

History, production, properties and uses of the more important elements and their important compounds:—

Hydorgen, oxygen, hydrogen peroxide, ozone.
Halogens, their hydracids, oxy-acids and salts.

Sulphur—allotropy, sulphur dioxide, sulphur trioxide, sulphurous and sulphuric acids, sulphuretted hydrogen, sodium thiosulphate.

Nitrogen—fixation, ammonia, nitrous oxide, nitric oxide, nitrogen tetroxide, nitrous and nitric acids.

Phosphorus—allotropic forms, phosphine, phosphorus pentoxide, phosphoric acids, halides of phosphorus.

Arsenic—arsine, oxides and oxy-acids.

Boron—boron trioxide, boric acid, borax.

Carbon—allotropy, products of destructive distillation of wood and coal, petroleum products, carbon monoxide, dioxide, methane, ethane, ethylene, acetylene, carbon disulphide, carbon tetra chloride, cyanogen, hydrocyanic acid, cyanides, ferrocyanides.

Only properties and uses of methyl and ethyl alcohols, formalin, acetaldehyde, acetone, formic, acetic, oxalic, citric, tartaric, stearic, tannic and carbolic acids. Ether, chloroform, iodoform, fats, oils, and carbohydrates.

Silicon, silica and sodium silicate.

Chief sources, properties and uses of the following common metals and of their important compounds :—

Sodium, potassium, copper, silver, gold, magnesium, calcium, barium, zinc, mercury, aluminium, tin, lead, antimony, bismuth, chromium, manganese and iron.

The methods of manufacture of only the following may be indicated :—

Aluminium, iron, gold, lead, sodium hydroxide, sodium carbonate, white lead, sodium hypochlorite, bleaching powder, potassium bichromate, potassium permanganate.

Practical—

Glass working : cutting, bending and drawing out tubing.
Purification of substances : distillation, crystallisation.
Solubility in general and solubility curves in particular of solids.
Equivalents of metals, magnesium, iron, lead, copper, aluminium.
Acidimetry and alkalimetry : typical methods of salt formation.
Estimation of soluble chlorides in neutral solutions volumetrically.
Oxidation and reduction treated generally with special reference to the use of permanganate and bichromate.
Effect of heat on various types of the more familiar compounds.
Preparation of hydrogen, oxygen, chlorine, hydrogen chloride, ammonia, nitric acid, sulphur dioxide, boric acid, alums, ferrous ammonium sulphate, sodium thiosulphate, potassium nitrate, nitrous oxide, methane, ethyl alcohol by fermentaion.
Composition by volume of air, ammonia, sulphur dioxide.
Relative density of oxygen and carbon dioxide.
Simple qualitative analysis. (Only at the end of the course).
Elementary notions about electrolytic dissociation should be given at this stage in the practical classes.

Books recommended for consultation :—

Theory.—Senter's Inorganic Chemistry.
Holmyard's Inorganic Chemistry.
Practical.—Smith's Laboratory Outline of Elementary Chemistry.
Caven's Quantitative Practical and Inorganic Preparations (2 Vols.).
Duncliff's Intermediate Practical Chemistry.
Historical Chemistry for outside reading :—Alembic Club Reprints.

NOTE.—(i) There will be no practical examination in Chemistry.
(ii) Candidates for the examination should be required to produce a certificate of having satisfactorily completed a course of practical laboratory work in the subject, signed by the Head of the Intermediate College.
(iii) The course in Chemistry should consist of two lectures per week of one hour each and one practical lesson per week of two and a half hours.

(8) *BIOLOGY.*

(a) *Elementary Botany.*

(1) A study of the parts of a flowering plant. Root and shoot systems.

Work of the roots. Stem and leaves. Form and structure of the parts as suited to function. An elementary knowledge of transpiration, photo-synthesis, respiration. Behaviour of parts of plants to gravity and light.

Flowers :—arrangement, parts and their functions, pollen and ovule, cross and selfpollination, fertilisation and dispersal of fruits and seeds.

Life history of the following plants :—

Chlamydomonas, Ulothrix, Spirogyra ; Bacteria ; Cystopus, Mucor, Agaricus ; Riccia, Marchantia, Moss ; Adiantum, Selagenella ; Cycas.

(b) *Elementary Zoology.*

(1) A study of the important features in the structure, functions and development of the following forms :—

1. Amœba, 2. Polystomella, 3. Lithocircus, 4. Euglena, 5. Copromonas 6. Volvox, 7. Monocystis, 8. Paramoecium, 9. Vorticella, 10. Stylonychia, 11. Opalina, 12. Hydra, 13. Obelia, 14. Earthworm, 15. Starfish, 16. Fresh water mussel, 17. Prawn, 18. Cockroach, 19. Amphioxus, 20. Dog fish, 21. Frog, 22. Rabbit.

The practical work will include a thorough examination of the microscopical preparations of the organisms, and their complete dissections and preparations of slides. A knowledge of the skeleton will be required.

(c) Common Portion.

Minute structure and division of cells and nucleii. Spermatogenesis and oogenesis in frog and earthworm. Reduction, division, and formation of micro and mega-spores in onion.

Food—

(1) Of plants—ordinary plant—beans, cuscuta sandal.
(2) Of animals, solid, liquid. Derived from plants or animals; consequent adaptations in animals, mouth with teeth or sucking apparatus, weapons for attack, etc.

Defence and attack—

(1) Plants—Acacia thorns, Nettles, Hairs, Insectivorous plants.
(2) Animals—Claws, Tusks, Shields, Poison, etc.

Interdependence of organisms collectively and individually.
CO_2 from animals used by plants; insects pollinating flowers, and animals dispersing fruits and seeds. Animals depending on plants for food.
Plants depending on plants, leguminous nodules, Nostoc. Lichens, sandal.
Animals depending on animals.
Hermit crab, Sea anemone and crab. Head louse, Flea, Tape worm.
Symbiosis, Parasitism.

Adaptation to Environments.—

(1) Plants—Xerophytic, Hydrophytic. Littoral vegetation, Lithophytic.
(2) Animals—Tadpole and frog, web foot in swimming birds, fins, bats, whale, etc Color in animals and plants.

Sex—

Hermaphrodite
Unisexual { Monœcious / Diœcious } Examples from animals and plants.
Polygamous.

Reproduction—

Vegetative
Parthenogenesis } Examples from plants and animals.
Sexual
Alternation of generation.

Races
Varieties
Species
Basis of classification.
Simple examples of cross breeding—Pea, Fowl.
Mendelism—Simple. 1 : 2 : 1 or 3 : 1 ratio
Geographical distribution.
Multiplication of individuals.
Checks.
Struggle for existence.
Natural Selection.
Mutation—Oenothera.
Evolution.
Evidence in support.
Usefulness of a knowledge of Biology.

BOOKS RECOMMENDED.

Any of the following :—

1.	James G. Needham	General Biology
2.	T. J. Parkar	Lessons in Elementary Biology
3.	J. A. Thompson	The Science of Life
4.	R. E. Lloyd	An Introduction to Biology
5.	T. J. Parkar and W. A. Haswell	A Manual of Zoology.

NOTE.—There shall be a practical examination in Biology.

II. INTERMEDIATE EXAMINATION IN SCIENCE.

I. ENGLISH.

Same as for Intermediate Examination in Arts.

II. LANGUAGES.

(a) Kannada.

There shall be one paper and the quantity to be prescribed shall be less than that prescribed for the Intermediate in Arts.

(b) Tamil.

Poetry, Prose, Grammar and Composition. The quantity prescribed shall be half that prescribed for Arts in Poetry and Prose.

Poetry—about 150 stanzas.

Prose— about 60 pages (Classical).

(c) Telugu.

There shall be one paper divided into two parts of which the first shall contain questions on text-books and on Grammar and the second shall consist of general subjects for composition on any *one* of which the candidate shall be required to write a short essay.

(d) Sanskrit.

(*a*) Detailed study of books prescribed from time to time.
(*b*) Elements of Practical Grammar.
(*c*) Translation from English into Sanskrit and *vice versa*.

(e) Persian.

Texts and Translation.

(f) Urdu.

Texts, Grammar and Composition.

III. MATHEMATICS (*compulsory*).

(a) Algebra.

	Lessons.
Ratio and Proportion, Variation, Theory of Indices, Simple surds. Elementary Theory of Logarithms and their application to Arithmetical computation, Quadratic Equations, Theory of Quadratic Functions, Arithmetic and Geometric series and simple series depending on them, Interest and Annuities, Binomial Theorem for a positive integral index and applications of the theorem to any rational index. Easy graphs.	50

(b) Trigonometry.

Measurement of angles, Trigonometric Functions and the relations to one another, Simple Equations, Solution of Triangles, Heights and Distances in one plane. Use of Trigonometric Tables. Sine and Cosine Graphs.	35

(c) Geometry.

Theorems as per Euclid Book II, III 25-39, Book VI, and XI (will be expanded in the final form of the syllabus). Construciton of circumscribed, inscribed and escribed circles of triangles and regular polygons, Medial Section, Construction of Triangles from given data and their division in a given ratio.	40

(d) Practical work. 25

IV. OPTIONAL SUBJECTS.

(1) ADDITIONAL MATHEMATICS.

(a) Algebra.

Solution of Simultaneous Quadratic Equations, Permutation and Combination. Convergence and Divergence of Series, Summation of Series, Indeterminate Equations, Partial Fractions.	25

(b) Trigonometry.

Addition, Multiplication and Division formulæ, Properties of Triangles and Circles connected with them, Inverse Trigonometric Functions, Limits and Approximations, Heights and Distances in different planes, Application of Logarithms to trigonometric computation, Addition and Multiplication of Vectors.	25

(c) *Geometry.*

	Lessons.
Properties of Triangles and Circles as in the present Entrance syllabus and the Analytic Geometry of the Point, the Straight Line, the Circle and the Parabola.	40

(d) *Calculus.*

Elements of the Differential and the Integral Calculus (as in C. M. Jessop's *Elementary Analysis*).	40

(e) *Dynamics.*

Resolution and Composition of forces, Conditions of equilibrium of Coplanar Forces acting at a point, Parallel Forces. Moments, Centre of Mass, Resolution and Composition of Displacements, Velocities and Accelerations, Laws of Motion; Simple cases of Dynamics of strings, Atwood's Machine, Work and Energy; Angular Velocity, Motion in one plane under constant acceleration, Simple Harmonic Motion, Simple Pendulum.	50

(f) *Tutorial.*

(Chiefly in Calculus and Dynamics).	20

(2) PHYSICS.

Same as for Intermediate Examination in Arts.

(3) CHEMISTRY.

Same as for Intermediate Examination in Arts.

(4) BIOLOGY.

Same as for Intermediate Examination in Arts.

(5) BOTANY.

1. Living and non-living things and their main features.
   Organic and inorganic substances.
   Plants and animals—Differences and resemblances—similarity of vital functions such as feeding, respiration, movement, response to stimuli and reproduction.
2. The green leaf.
   Its external and internal structure.
   Photo-synthesis.
   Transpiration.

Leaf form and internal structure, as well suited to carry on the above two functions.

Adaptations to facilitate and check transpiration; leaf adjustments to light, phototropism. Arrangement of the leaves on the Plant. Struggle for light among Plants. Climbing plants and epiphytes. General leaf forms. Stipules and their work. Modifications of leaves and stipules.

3. Root. Its external form, internal structure; work of roots—absorption and fixation—root cap, root hairs, region of root hairs, work of root hairs; Osmosis.

Root pressure. Study of the soil. Its structure and nature of the soil in relation to the water contents. Branching of the roots. Elongation and growth of roots in thickness. Different kinds of roots. Modifications of roots. Response of roots to gravity, light and water.

4. Stem. Internal structure; work of the stem—supporting and conducting. Path of the sap current; intercellular spaces, lenticels; increase of stem in thickness; cork formation, sap wood and heart wood; modification of stems. Response of the stem to gravity and light.

Stems of water plants.

5. Flowers. Parts of a flower; functions of different parts; Pollen grains; pollen tube; ovule; egg cell; fertilisation.
   Seed formation. Parts of a seed. Arrangements of the parts of a flower; insect visitors; cross and self-pollination.

Advantages of cross pollination; adaptations for cross pollination; wind pollination and inconspicuous flowers. Inflorescences. Seeds; fruits; kinds of fruits; seed and fruit dispersal and its advantages; Struggle for existence. Survival of the fittest; variety, species, heredity and evolution.

Study of the following families:—Anonaceæ, Magnoliaceæ, Malvaceæ Leguminosæ, Myrtaceæ, Rubiaceæ, Compositeæ, Convolvulaceæ, Solanaceæ, Acanthaceæ, Labiateæ, Euphorbiaceæ, Liliaceæ, Amaryllidæ, Palmæ.

Some plant products.—Starch, Oils, Sugars, Alkaloids, Gums, Resins, Coutchouc, Fibres, the plants and the parts of the plant producing them.

6. Apex of the stem and the root. Meristem, Cell structure.
Cell division; changes seen in the cell contents and the nature of the cell wall.

Life history of.—Chlamydomonas, Structure, Locomotion, all the life functions carried out by the single cell. A brief account of Volvacales.—Origin of sex, increase in plant body and division of labour. Origin of Soma. Ulothrix, Spirogyra, Fucus, Simplest land plants such as Liverworts; Mosses; Ferns; Lycopods, Selaginella and Cycas. Seed plants.

7. Bacteria, Structure and life history, fermentation, Enzymes, Symbiosis, Pathogenic Bacteria, Fungi—Saprophytes, Parasites, Mucor; Phytophthora, Yeast plants. Fermentations; Parasitic flowering plants, Insectivorous plants.

Practical Work.—Students are expected to examine with hand lens the external features of all the plants and to be able to refer the plants to their families. They should be able to prepare free hand sections of the various parts of the plant body for microscopic examination and identify the prepared slides of the forms mentioned in Paras 6 and 7. Special attention must be given to the class experimental demonstrations of the various physiological functions of the plant organs.

Text-books.—

(1) A Text-Book of Botany by Strasburger.
(2) Elements of Plant Biology by Tansley.
(3) Text-Book of Botany by Ganoug, Parts I and II.
(4) Handbook of Botany for India by K. Rangachari.
(5) Botany for Students of Medicine and Pharmacy by Fritch and Salisbury.

NOTE.—(i) There shall be a practical examination in Botany.
(ii) The course in Botany shall consist of two lectures per week of one hour each and practical lesson of 2½ hours per week.

(6) ZOOLOGY.

A study of important features in the structure, habits, life history and mutual relations of the leading types included in the following phyla: Protozoa, Coelenterata, Platyhelminthes, Nematoda, Annelida, Echinodermata, Arthropoda, Mollusca and Vertebrata. *The human parasites and animals of economic importance will receive greater attention.*

The practical work includes a microscopical examination of the organisms; specially prepared slides to illustrate parts or entire structures of the types; dissections of the earthworm, leech, cockroach, fish, frog, lizard, pigeon and rabbit so as to illustrate the principal anatomical characters. A complete examination of the external characteristics of the Jelly fish, Sea Anemone, Corals, tape and round worms, a marine worm, Centipede, Scorpion, Mosquito, House-fly, Flea, prawn, crab, fresh water mussel, pond snail, sepia and specimens of echinodermata, together with a general acquaintance with the skeletal features of the vertebrate types, is included. Attention of students is to be drawn to the life history of the mosquito and fly.

The practical examination will require the candidates to dissect the types referred to above, besides examination and simple preparation of slides and identification of material illustrative of the systems of organs of the different forms.

The above syllabus is amply covered by the following books any *one* of which may be prescribed for study:—

1. J. Graham Kerr .. .. .. Zoology for Medical Students.
2. A. E. Shipley and E. W. Mac Bride .. .. A Text-book of Zoology.
3. J. A. Thompson .. .. .. Outlines of Zoology.
4. Alexander Meek .. .. .. Essentials of Zoology.
5. R. W. Hegner .. .. .. College Zoology.
6. Hertwig and Kingsley .. .. .. A Manual of Zoology.
7. H. Osborn .. .. .. Economic Zoology.

NOTE.—(i) There shall be a practical examination in Zoology.
(ii) The course in Zoology shall consist of two lectures per week of one hour each and practical lesson of 2½ hours per week.

(7) GEOLOGY.

(a) *Physiography.*

An elementary course of lectures on the following:—

The Earth as a planet, its general relations to the other members of the Solar System, Hypothesis as to the origin of the Earth; Form, size and density of the Earth; its movements and effects.

The Atmosphere and the Hydrosphere—General considerations such as their composition, temperature and movements. The lithosphere—the chief constituents of the Earth's crust. Condition of the interior of the Earth.

Agents of Geological Change.—The hypogene and epigene agents, manner and results of their action especially as influencing earth sculpture.

Climate, their causes and distribution; glacial epochs.

(b) Crystallography and Mineralogy.

Symmetry; planes and axes of symmetry; laws of crystallography; the common holohedral crystal forms and combinations; Weiss and Naumann's notations.

The chief characteristics of the most important rock forming minerals; occurrence and alteration products.

(c) Petrology.

Origin and classification of all the more important types of rocks; their composition and alteration; general principles of Metamorphism.

Mode of occurrence and distribution of rock types in Mysore.

(d) Structural and Field Geology.

Elementary knowledge of structural features exhibited by rock masses such as bedding, dip, strike, folds, faults, cleavage, foliation and joints; construction and interpretation of simple geological maps and sections.

Relation between geological structure and scenery, water supply.

(Geological excursion for at least a fortnight is essential.)

(e) Stratigraphy and Palæontology.

Stratigraphical classification; the meaning of unconformity and overlap; imperfection of the geological record; fossils, their mode of formation and value in Geology and also in the Biological sciences; the general characteristics of the great systems of stratigraphy in Europe; elementary knowledge of the Geology of India with special reference to the geological history of Mysore, the order of succession of animal and plant life on the surface of the globe.

Practical Work.—Preparation and interpretation of physical and geological maps; and the drawing of sections across them. Identification and description of minerals, rocks, and fossils.

Text-books recommended :—

(1) A. Geikie's Class Book of Geology.
(2) Rutley's Mineralogy (revised by Read).
(3) Harker's Petrology for Students.
(4) Geological History of Mysore by Dr. Smeeth.

Note.—(i) There shall be a practical examination in Geology.

(ii) The course in Geology shall consist of two lectures per week of one hour each and practical lesson of 2½ hours per week.

III. INTERMEDIATE EXAMINATION IN SCIENCE.

(For those proceeding to Medicine.)

1. *English.*

One paper on Texts and Composition.*

2. *Mathematics.*

Same as for Intermediate Examination in Science (General) : Mathematics—compulsory.

3. *Physics.*

Same as for Intermediate Examination in Arts.

4. *Chemistry.*

Same as for Intermediate Examination in Arts.

NOTE.—There will be a practical examination in Physics and Chemistry.

**Note.*—"Wherever there is a single English paper at the Intermediate Examination in Science, that paper shall be a paper on Texts and Composition." (Resolution of the joint meeting of the Faculties of Arts and Science, dated the 7th May 1927.)

5. *Botany.*

Same as for Intermediate Examination in Science (General).

6. *Zoology.*

Same as for Intermediate Examination in Science (General).

Note.—In addition to the practical examination in Botany and Zoology, there shall also be *Viva Voce*, in these two subjects.

IV. INTERMEDIATE EXAMINATION IN SCIENCE.

(For those proceeding to the Degree of B.E.)

1. ENGLISH

One paper on Texts and Composition.*

2. SECOND LANGUAGE

There shall be one paper and the quantity to be prescribed shall be less than that prescribed for the Intermediate Examination in Arts.

1. *Kannada*
2. *Tamil*
3. *Telugu*
4. *Sanskrit*
5. *Persian*
6. *Urdu*

Same as for Intermediate Examination in Science.

3. MATHEMATICS

Same as for Intermediate Examination in Arts.

4. PHYSICS

Same as for Intermediate Examination in Arts.

5. CHEMISTRY

Same as for Intermediate Examination in Arts.

6. GEOLOGY.

Same as for Intermediate Examination in Science.

*NOTE.—"Wherever there is a single English paper at the Intermediate Examination in Science, that paper shall be a paper on Texts and Composition." (Resolution of the joint meeting of the Faculties of Arts and Science, dated the 7th May 1927.)

SCHEME OF EXAMINATION.

I. INTERMEDIATE EXAMINATION IN ARTS.

I. INTERMEDIATE IN ARTS.

I. ENGLISH.

			Max. Marks
1.	Composition	.. 1 paper of 3 hours	.. 100
2.	Texts	.. " "	.. 100

II. LANGUAGES.

Kannada.

1.	Texts and Grammar	.. 1 paper of 3 hours	.. 120
2.	Composition	.. " 2 hours	.. 80

Tamil.

1.	Texts and Grammar	.. 1 paper of 3 hours	.. 120
2.	Composition	.. " 2 hours	.. 80

Telugu.

1.	Texts and Grammar	.. 1 paper of 3 hours	.. 120
2.	Composition	.. " 2 hours	.. 80

Sanskrit.

1.	Texts and Grammar	.. 1 paper of 3 hours	.. 120
2.	Translation	.. " 2 hours	.. 80

	Urdu.		MAX. MARKS
1. Texts and Grammar	.. 1 paper of 3 hours	..	120
2. Composition (Essay)	.. „ 2 hours	..	80
	Persian.		
1. Texts and Grammar	.. 1 paper of 3 hours	..	120
2. Translation	.. „ 2 hours	..	80
	French.		
1. Translation from prepared Text-book and Grammar	.. 1 paper of 3 hours	..	120
2. Translation from unseen Prose writers, and Composition	.. „ 2 hours	..	80

III. OPTIONALS.

(*a*) A SELECTED LANGUAGE.

(1) *Old and Middle Kannada.*

1. Texts and Grammar	.. 1 paper of 3 hours	..	100
2. Composition	.. „	..	100

(2) *Modern Kannada.*

1. Texts and Grammar	.. 1 paper of 3 hours	..	100
2. Composition	.. „	..	100

(3) *Tamil.*

1. Texts and Grammar	.. 1 paper of 3 hours	..	100
2. Composition	.. „	..	100

(4) *Telugu.*

1. Texts and Grammar	.. 1 paper of 3 hours	..	100
2. Translation	.. „	..	100

(5) *Sanskrit.*

1. Texts and Grammar	.. 1 paper of 3 hours	..	100
2. History of Sanskrit Language and Literature	.. „	..	100

(6) *Persian.*

1. Prose and Poetry	.. 1 paper of 3 hours	..	100
2. Grammar, Rhetoric, Prosody and Literature	.. „	..	100

(7) *Urdu.*

1. Prose and Poetry	.. 1 paper of 3 hours	..	100
2. Grammar, Rhetoric, Prosody and Literature	.. „	..	100

(8) *Arabic.*

1. Prose and Poetry	.. 1 paper of 3 hours	..	100
2. Grammar, Rhetoric, Prosody and Literature	.. „	..	100

(*b*) ANCIENT HISTORY (*including Indian History*).

1. History of Greece and Rome	.. 1 paper of 3 hours	..	100
2. History of India to 1206 A.D.	.. „	..	100

			Max. Marks
	(*c*) MODERN HISTORY (*including Indian History*).		
1.	History of England from 1485 A.D.	1 paper of 3 hours	100
2.	History of India from 1206 A.D.	"	100
	(*d*) LOGIC.		
1.	First paper (Deductive Logic)	1 paper of 3 hours	100
2.	Second paper (Inductive Logic)	"	100
	(*e*) MATHEMATICS.		
1.	Algebra and Calculus	1 paper of 2½ hours	100
2.	Trigonometry and Geometry	"	100
	(*f*) PHYSICS.		
1.	First paper	1 paper of 3 hours	100
2.	Second paper	"	100
	(*g*) CHEMISTRY.		
1.	First paper	1 paper of 3 hours	100
2.	Second paper	"	100
	(*h*) BIOLOGY.		
1.	Theory	1 paper of 3 hours	100
2.	Practical	"	100

II. INTERMEDIATE EXAMINATION IN SCIENCE.

(leading to B.Sc.)

I. ENGLISH.

1.	Texts	1 paper of 3 hours	100
2.	Composition	"	100

II. LANGUAGES.

Kannada:—Texts and Composition	1 paper of 3 hours	100
Tamil:—Texts and Composition	1 paper of 3 hours	100
Telugu:—Texts and Composition	1 paper of 3 hours	100
Sanskrit:—Texts, Grammar and Translation	1 paper of 3 hours	100
Urdu:—Texts, Grammar and Composition	1 paper of 3 hours	100
Persian:—Texts, Grammar and Translation	1 paper of 3 hours	100

III. MATHEMATICS (compulsory).

Mathematics	1 paper of 3 hours	100

IV. OPTIONALS.

(1) *Additional Mathematics.*

1.	Algebra, Trigonometry and Geometry	1 paper of 2½ hours	100
2.	Calculus and Dynamics	"	100

		Max. Marks
	(2) *Physics.*	
1. First paper	.. 1 paper of 3 hours	.. 100
2. Second paper	.. "	.. 100
	(3) *Chemistry.*	
1. First paper	.. 1 paper of 3 hours	.. 100
2. Second paper	.. "	.. 100
	(4) *Biology.*	
1. Theory	.. 1 paper of 3 hours	.. 100
2. Practical	.. "	.. 100
	(5) *Botany.*	
1. Theory	.. 1 paper of 3 hours	.. 100
2. Practical	.. "	.. 100
	(6) *Zoology.*	
1. Theory	.. 1 paper of 3 hours	.. 100
2. Practical	.. "	.. 100
	(7) *Geology.*	
1. Theory	.. 1 paper of 3 hours	.. 100
2. Practical	.. "	.. 100

III. INTERMEDIATE EXAMINATION IN SCIENCE.

(leading to Medicine.)

	I. ENGLISH.	
Texts and Composition	.. 1 paper of 3 hours	.. 100
	II. MATHEMATICS.	
Mathematics	.. 1 paper of 3 hours	.. 100
	III. PHYSICS.	
1. First paper	.. 1 paper of 3 hours	.. 75
2. Second paper	.. "	.. 75
3. Practical	.. "	.. 50
	IV. CHEMISTRY.	
1. First paper	.. 1 paper of 3 hours	.. 75
2. Second paper	.. "	.. 75
3. Practical	.. "	.. 50
	V. BOTANY.	
1. First paper	.. 1 paper of 3 hours	.. 100
2. Practical	.. "	.. 100
3. *Viva Voce*	.. 15 minutes	.. 50
	VI. ZOOLOGY.	
1. First paper	.. 1 paper of 3 hours	.. 100
2. Practical	.. "	.. 100
3. *Viva Voce*	.. 15 minutes	.. 50

Note.—For purposes of tabulation, the maximum total marks in Botany and Zoology, *viz.*, 250, will be converted on the basis of 200 maximum.

(Resolution 6 of the Faculty of Science, dated the 11th April 1927.)

IV. INTERMEDIATE EXAMINATION IN SCIENCE.

(leading to the Degree of B. E.)

I. ENGLISH

		Max. Marks.
Texts and Composition	1 paper of 3 hours	100

II. SECOND LANGUAGE

Texts and Composition or Translation	1 paper of 3 hours	100

III. MATHEMATICS

1. Algebra and Calculus	1 paper of 2½ hours	100
2. Trigonometry and Geometry	"	100

IV. PHYSICS

1. First paper	1 paper of 3 hours	100
2. Second paper	"	100

V. CHEMISTRY

1. First paper	1 paper of 3 hours	100
2. Second paper	"	100

VI. GEOLOGY

1. First paper	1 paper of 3 hours	100
2. Practical	"	100

B. M. SRIKANTIA,
Registrar